General

Guideline Title

Best evidence statement (BESt). Reducing pain for children and adolescents receiving injections.

Bibliographic Source(s)

Cincinnati Children's Hospital Medical Center. Best evidence statement (BESt). Reducing pain for children and adolescents receiving injections. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2013 Jan 16. 9 p. [9 references]

Guideline Status

This is the current release of the guideline.

Recommendations

Major Recommendations

The strength of the recommendation (strongly recommended, recommended, or no recommendation) and the quality of the evidence (1aâ€'5b) are defined at the end of the "Major Recommendations" field.

1. It is strongly recommended that age-appropriate interventions with strong evidence, be used to reduce pain during injections (Chambers et al., 2009 [1a]; Shah et al., 2009 [1a]; Taddio et al., 2009 [1a]; Uman et al., 2010 [1a]; Kassab et al., 2012 [1b]; Harrington et al., 2012 [2a]). See cells marked "Strongly" in Table 1 below. See Table 2 in the original guideline document for intervention-specific citations.
   Note: Combining an intervention with distraction is more effective than a single intervention (Uman et al., 2010 [1a]).
2. It is recommended that, when strongly recommended interventions are not sufficient or feasible to reduce pain during injections, additional age-appropriate consensus-based interventions are used (Local Consensus [5]). See cells marked "Local Consensus" in Table 1 below. See Table 2 in the original guideline document for intervention-specific citations.
   Note: Combining an intervention with distraction is more effective than a single intervention (Uman et al., 2010 [1a]).

Table 1: Recommendations for Interventions by Developmental Level to Reduce Pain during Injections

	Infants	Toddlers	Preschool-age Children	School-age Children	Adolescents
Sucrose solution*	Strongly	--	--	--	--
Breastfeeding	Strongly	--	--	--	--

Holding the infant Distraction*, age-appropriate	Strongly Infants Strongly	Toddlers Strongly	Preschool-age Strongly Children	School-age Strongly Children	Adolescents Strongly
Topical agent, containing lidocaine/prilocaine	Strongly	Strongly	Strongly	Strongly	Strongly
Sequential injection*	Strongly	Strongly	Strongly	Strongly	Strongly
Rapid combined injection*	Strongly	Strongly	Strongly	Strongly	Strongly
Preparation*, developmentally appropriate	--	Local consensus	Strongly	Strongly	Local consensus
Positioning	--	Local consensus	Strongly	Local consensus	Local consensus
Breathing exercises*†	--	--	Strongly	Strongly	Local consensus
Hypnosis*	--	--	Strongly	Strongly	Strongly

Note: See the original guideline document for additional details on interventions.

* See the definitions under "Supporting Information" in the original guideline document.

†Including blowing bubbles, using party blowers, deep breathing, and breathing exercises

Definitions:

Table of Evidence Levels

Quality Level	Definition
1a† or 1b†	Systematic review, meta-analysis, or meta-synthesis of multiple studies
2a or 2b	Best study design for domain
3a or 3b	Fair study design for domain
4a or 4b	Weak study design for domain
5a or 5b	General review, expert opinion, case report, consensus report, or guideline
5	Local Consensus

†a = good quality study; b = lesser quality study

Table of Recommendation Strength

Strength	Definition
It is strongly recommended that… It is strongly recommended that… not…	When the dimensions for judging the strength of the evidence are applied, there is high support that benefits clearly outweigh risks and burdens. (or visa-versa for negative recommendations)
It is recommended that… It is recommended	When the dimensions for judging the strength of the evidence are applied, there is moderate support that benefits are closely balanced with risks and burdens.

Strength	Definition
that…not…	
There is insufficient evidence and a lack of consensus to make a recommendation…	

Note: See the original guideline document for the dimensions used for judging the strength of the recommendation.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Conditions requiring injections

Guideline Category

Management

Clinical Specialty

Family Practice

Internal Medicine

Pediatrics

Intended Users

Advanced Practice Nurses

Nurses

Physician Assistants

Physicians

Guideline Objective(s)

To evaluate, in pediatric patients receiving injections, if pharmacological interventions (including topical anesthetic agents), psychological, and physical interventions versus no intervention, reduces pain during injections

Target Population

Children ranging from infancy to eighteen years of age, receiving an injection

Interventions and Practices Considered

1. Sucrose solution

2. Breastfeeding
3. Holding the infant
4. Distraction (age-appropriate)
5. Topical agent containing lidocaine/prilocaine
6. Sequential injection
7. Rapid combined injection
8. Preparation (developmentally appropriate)
9. Positioning
10. Breathing exercises (including blowing bubbles, using party blowers, deep breathing)
11. Hypnosis

Major Outcomes Considered

Reduced pain level

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Search Strategy

- Databases: BMJ, CINAHL, Cochrane Database, ERIC, Nursing Reference Center, Psycho Info, PubMed
- Search Terms: Children, injections, immunization, pain, distress, EMLA, LMX-4, Gebauers Spray and Stretch, Zingo, Paineze, Synera, J-tip, Pediatric, Ice
- Limits, Filters, Search Dates: 1992 – January, 2012, Articles in English only

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Table of Evidence Levels

Quality Level	Definition
1a† or 1b†	Systematic review, meta-analysis, or meta-synthesis of multiple studies
2a or 2b	Best study design for domain
3a or 3b	Fair study design for domain
4a or 4b	Weak study design for domain

Quality Level	Definition
5a or 5b	General review, expert opinion, case report, consensus report, or guideline
5	Local Consensus

†a = good quality study; b = lesser quality study

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review

Description of the Methods Used to Analyze the Evidence

Not stated

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Not stated

Rating Scheme for the Strength of the Recommendations

Table of Recommendation Strength

Strength	Definition
It is strongly recommended that… It is strongly recommended that… not…	When the dimensions for judging the strength of the evidence are applied, there is high support that benefits clearly outweigh risks and burdens. (or visa-versa for negative recommendations)
It is recommended that… It is recommended that… not…	When the dimensions for judging the strength of the evidence are applied, there is moderate support that benefits are closely balanced with risks and burdens.
There is insufficient evidence and a lack of consensus to make a recommendation…	

Note: See the original guideline document for the dimensions used for judging the strength of the recommendation.

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Peer Review

Description of Method of Guideline Validation

This Best Evidence Statement has been reviewed against quality criteria by two independent reviewers from the Cincinnati Children's Hospital Medical Center (CCHMC) Evidence Collaboration.

Evidence Supporting the Recommendations

References Supporting the Recommendations

Chambers CT, Taddio A, Uman LS, McMurtry CM, HELPinKIDS Team. Psychological interventions for reducing pain and distress during routine childhood immunizations: a systematic review. Clin Ther. 2009;31(Suppl 2):S77-S103. [40 references] PubMed

Harrington JW, Logan S, Harwell C, Gardner J, Swingle J, McGuire E, Santos R. Effective analgesia using physical interventions for infant immunizations. Pediatrics. 2012 May;129(5):815-22. PubMed

Kassab MI, Roydhouse JK, Fowler C, Foureur M. The effectiveness of glucose in reducing needle-related procedural pain in infants. J Pediatr Nurs. 2012 Feb;27(1):3-17. PubMed

Shah V, Taddio A, Rieder MJ, HELPinKIDS Team. Effectiveness and tolerability of pharmacologic and combined interventions for reducing injection pain during routine childhood immunizations: systematic review and meta-analyses. Clin Ther. 2009;31 Suppl 2:S104-51. [97 references] PubMed

Taddio A, Ilersich AL, Ipp M, Kikuta A, Shah V, HELPinKIDS Team. Physical interventions and injection techniques for reducing injection pain during routine childhood immunizations: systematic review of randomized controlled trials and quasi-randomized controlled trials. Clin Ther. 2009;31(Suppl 2):S48-76. [73 references] PubMed

Uman LS, Chambers CT, McGrath PJ, Kisely SR. Psychological interventions for needle-related procedural pain and distress in children and adolescents. In: Cochrane Database of Systematic Reviews [database online]. Issue 11. Hoboken (NJ): John Wiley and Sons Ltd.; 2010

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Reduced pain during injections

Potential Harms

- Gagging and coughing were the minimal side effects noted when using the sucrose solution in infants
- Lidocaine-prilocaine had minimal transient local skin reaction

Qualifying Statements

Qualifying Statements

This Best Evidence Statement addresses only key points of care for the target population; it is not intended to be a comprehensive practice guideline. These recommendations result from review of literature and practices current at the time of their formulation. This Best Evidence Statement does not preclude using care modalities proven efficacious in studies published subsequent to the current revision of this document. This document is not intended to impose standards of care preventing selective variances from the recommendations to meet the specific and unique requirements of individual patients. Adherence to this Statement is voluntary. The clinician in light of the individual circumstances presented by the patient must make the ultimate judgment regarding the priority of any specific procedure.

Implementation of the Guideline

Description of Implementation Strategy

Applicability Issues

Breastfeeding in infants, developmentally supportive positioning, and injection technique (the use of sequential injection and rapid combined injection) do not require additional funds, resources, or staffing. The use of developmentally appropriate preparation and distraction, deep breathing, and bubble blowing/party blowers can be taught to patients and caregivers. These interventions fall within the scope of practice of a Child Life Specialist. When involved, they can give recommendations to patients and caregivers on which techniques are most appropriate. At that time, the child and family can choose which of these options will best meet their needs. The additional time needed to involve these techniques or a Child Life Specialist may be counterbalanced by more cooperative patients, shorter length of time spent giving an injections, as well as increase family satisfaction. The use of sucrose and lidocaine/prilocaine poses a monetary cost. However, evidence shows the use of these products reduces pain for infants, children, and adolescents. Use of these products may increase compliance with injections, specifically vaccinations, in turn offsetting costs of pharmacological agents and increasing the overall health and wellbeing of children.

Implementation Tools

Audit Criteria/Indicators

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Staying Healthy

IOM Domain

Effectiveness

Identifying Information and Availability

Bibliographic Source(s)

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Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2013 Jan 16

Guideline Developer(s)

Cincinnati Children's Hospital Medical Center - Hospital/Medical Center

Source(s) of Funding

Cincinnati Children's Hospital Medical Center

Guideline Committee

Not stated

Composition of Group That Authored the Guideline

Group/Team Members: Melissa Liddle, BS, CCLS, CTRS, Inpatient Psychiatry; Annette Bonjour, BS, CCLS, Division of Developmental and Behavioral Pediatrics; Courtney Tyra, MS, CCLS, GI/Colorectal Center for Children; Lauren Kathman, BS, CCLS, Complex Airway & Pediatric Primary Care Center; Jennifer Staab, MS, CCLS, Child Life Specialist at Denver Children's Hospital; Mary Ellen Meier, MSN, RN, CPN, Center for Professional Excellence and Business Integration: Research and Evidence Based Practice: Evidence Based Practice Mentor

Financial Disclosures/Conflicts of Interest

Conflict of interest declaration forms are filed with the Cincinnati Children's Hospital Medical Center Evidence-based Decision Making (CCHMC EBDM) group.

Guideline Status

This is the current release of the guideline.

Guideline Availability

Electronic copies: Available from the Cincinnati Children's Hospital Medical Web site.

Print copies: For information regarding the full-text guideline, print copies, or evidence-based practice support services contact the Cincinnati Children's Hospital Medical Center Health James M. Anderson Center for Health Systems Excellence at EBDMInfo@cchmc.org.

Availability of Companion Documents

The following are available:

- Judging the strength of a recommendation. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2008 Jan. 1 p. Available from the Cincinnati Children's Hospital Medical Center.
- Grading a body of evidence to answer a clinical question. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 1 p. Available from the Cincinnati Children's Hospital Medical Center.
- Table of evidence levels. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2008 Feb 29. 1 p. Available from the Cincinnati Children's Hospital Medical Center.

Print copies: For information regarding the full-text guideline, print copies, or evidence-based practice support services contact the Cincinnati Children's Hospital Medical Center Health James M. Anderson Center for Health Systems Excellence at EBDMInfo@cchmc.org.

In addition, suggested process or outcome measures are available in the original guideline document.

Patient Resources

None available

NGC Status

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